Appl. No.: 10/629,397
Amdt. Dated: November 13, 2006
Reply to Office Action of: June 1, 2006

The listing of claims will replace all prior versions, and listings, of claims in the application. Deletions are struck through and insertions are underlined.

Listing of Claims:

1. **(currently amended)** A scatter-free optical fluoride crystal for transmitting below 200 nm wavelengths comprising an optical fluoride crystal having a chlorine concentration of less 0.25 ppm Cl, said crystal being scatter-free when a red laser beam scatter inspection light is passed through the crystal to detect scatter.

2. **(original)** A scatter-free according to claim 1, wherein said optical fluoride crystal is selected from the group consisting of calcium fluoride, barium fluoride, magnesium fluoride, strontium fluoride and lithium fluoride, and mixtures thereof.

3. **(currently amended)** The scatter-free crystal according to claim 1, wherein said optical fluoride crystal is a calcium fluoride crystal having a below 200 nm transmission >99%/cm.

4. **(currently amended)** The scatter-free crystal according to claim 1, wherein said optical fluoride crystal is a calcium fluoride crystal having a chlorine concentration of less than 0.2 ppm Cl and a 193nm transmission >99%/cm.

5. **(currently amended)** The scatter-free crystal according to claim 1, wherein said optical fluoride crystal is a calcium fluoride crystal having a chlorine concentration of less than 0.2 ppm Cl and a 157nm transmission >99%/cm.

6. **(currently amended)** The scatter-free crystal according to claim ~~1~~ 2, wherein said optical fluoride crystal is a calcium fluoride crystal having a chlorine concentration of less than 0.2 ppm Cl and a 157nm transmission >99%/cm.

7. **(currently amended)** The scatter-free crystal according to claim 1, wherein said optical fluoride crystal is a calcium fluoride crystal having a combined chlorine and sulfur concentration Cl + S of less than 0.3 ppm Cl and a transmission >99%/cm. in the 157-199 nm range.

8. **(currently amended)** The scatter-free crystal according to claim 7, wherein Cl + S is less than 0.2 ppm and a 157 nm transmission>99%/cm.

9. (withdrawn) A method of making a scatter-free below 200 nm wavelength transmitting optical fluoride crystal, said method comprising:

providing a optical fluoride feedstock having a chlorine content less than 0.5 ppm Cl by weight,

providing crucible comprised of a low-chlorine graphite having a chlorine content less than 0.3 ppm Cl and placing said feedstock into said crucible,

melting said feedstock in said crucible to form a low-chlorine optical fluoride melt, and

growing an optical fluoride crystal from said melt,

wherein said grown optical fluoride crystal having a chlorine concentration less than 0.25 ppm Cl.

10. (withdrawn) The method according to claim 9, wherein the feedstock is selected from the group consisting of calcium fluoride, barium fluoride, magnesium fluoride, strontium fluoride and lithium fluoride, and mixtures of any of the foregoing.

11. (withdrawn) A method as claimed in 9 wherein the optical fluoride crystal is a calcium fluoride crystal, and said method includes transmitting a scatter inspection light into said grown optical fluoride crystal and inspecting the crystal for an observable level of scatter to provide a scatter-free optical fluoride lens blank with a chlorine concentration less than 0.2 ppm Cl by weight.

12. (withdrawn) A method as claimed in 9 wherein said feedstock chlorine content is ≤ 0.4 ppm.

13. (withdrawn) A method as claimed in 9 wherein said feedstock is calcium fluoride having a chlorine content is ≤ 0.25 ppm, said crucible graphite chlorine content is ≤ 0.25 ppm, and said grown calcium fluoride crystal has a chlorine concentration ≤ 0.2 ppm.

14. (withdrawn) A method as claimed in 12 wherein said grown calcium fluoride crystal has a 193 nm transmission > 99%/cm.

15. (withdrawn) A method as claimed in 12 wherein said grown calcium fluoride crystal has a 157 nm transmission > 97 %/cm.

16. (withdrawn) A method of making a scatter-free optical fluoride crystal for transmitting below 200 nm wavelengths, said method including:

providing a low-chlorine content optical fluoride feedstock having a chlorine content less than 0.5 ppm Cl,

providing an optical fluoride crystal crucible for containing an optical fluoride crystal, said crucible comprised of a purified graphite having a chlorine content less than 0.3 ppm Cl,

providing a controlled atmosphere optical fluoride crystal furnace for heating an optical fluoride crystal material,

loading said optical fluoride feedstock and said optical fluoride crystal crucible into said optical fluoride crystal furnace,

heating said feedstock into a low-chlorine melt and

growing an optical fluoride crystal from said melt to provide a grown scatter-free optical fluoride crystal having a chlorine concentration less than 0.25 ppm Cl and a below 200 nm transmission > 99%/cm .

17. (withdrawn) A method as claimed in claim 15, wherein said optical fluoride feedstock is selected from the group consisting of calcium fluoride, barium fluoride, magnesium fluoride, strontium fluoride and lithium fluoride.

18. (withdrawn) A method as claimed in claim 15. wherein said low-chlorine content optical fluoride feedstock is selected from the group consisting of a synthetic powder and a pre-melted fluoride crystal material.

19. (withdrawn) A method of making an optical calcium fluoride crystal, including blanks and elements made therefrom, for transmitting below 200 nm wavelengths, said method including:

providing a controlled atmosphere optical fluoride crystal furnace for heating an optical fluoride crystal material, said furnace containing a calcium fluoride crystal material and a purified graphite having a chlorine content less than 0.3 ppm Cl by weight,

heating said calcium fluoride crystal material in said furnace containing said graphite having a chlorine content less than 0.3 ppm Cl to provide a scatter-free optical calcium fluoride crystal having a chlorine concentration less than 0.25 ppm Cl by weight and a below 200 nm transmission > 99%/cm.